What is claimed is:

1. A method of processing at least first and second time domain plethysmographic signals obtained from a patient, said method comprising the steps of:

selecting at least one desired portion of the first time domain plethysmographic signal;

selecting at least one desired portion of the second time domain plethysmographic signal;

transforming the selected desired portions of the first and second time domain plethysmographic signals into first and second frequency domain plethysmographic signal portions corresponding to the selected desired portions of the first and second time domain plethysmographic signals;

transforming the first and second frequency domain plethysmographic signal portions into first and second cepstral domain plethysmographic signal portions corresponding to the selected desired portions of the first and second time domain plethysmographic signals; and

examining at least one of the first and second cepstral domain plethysmographic signal portions to obtain information therefrom relating to a physiological condition of the patient.

2. The method of claim 1 wherein the physiological condition of the patient comprises a pulse rate of the patient.

3. The method of claim 1 wherein said step of selecting at least one desired portion of the first time domain plethysmographic signal comprises:

positioning a first data selection window over the desired portion of the first time domain plethysmographic signal; and

adjusting a length of the first data selection window to correspond with a length of the desired portion of the first time domain plethysmographic signal;

and wherein said step of selecting at least one desired portion of the second time domain plethysmographic signal comprises:

positioning a second data selection window over the desired portion of the second time domain plethysmographic signal; and

adjusting a length of the second data selection window to correspond with a length of the desired portion of the second time domain plethysmographic signal.

4. The method of claim 3 further comprising:

analyzing the first and second time domain plethysmographic signals without selecting portions thereof to identify at least one region of each of the first and second time domain plethysmographic signals wherein motion artifacts present in the first and second plethysmographic signals are below an acceptable level.

5. The method of claim 1 wherein said step of transforming the selected desired portions of the first and second time domain plethysmographic signals to first and second spectral domain plethysmographic signal portions comprises performing Fast Fourier Transform operations on the selected desired portions of the first and second time domain plethysmographic signals, and wherein said step of transforming the first and second spectral domain plethysmographic signal portions to first and second cepstral domain plethysmographic signal portions comprises performing Fast Fourier Transform operations on the first and second spectral domain plethysmographic signal portions.

6. The method of claim 5 further comprising:

adjusting a size of the Fast Fourier Transform operations in accordance with a predetermined parameter.

7. The method of claim 6 wherein the predetermined parameter comprises the patient's pulse rate.

8. The method of claim 1 further comprising:

transmitting a red wavelength optical signal through a tissue site of the patient to obtain the first time domain plethysmographic signal; and

transmitting an infrared wavelength optical signal through the tissue site of the patient to obtain the second time domain plethysmographic signal.

9. The method of claim 8 wherein the physiological condition of the patient comprises an SPO2 level of the patient.

10. A method of assessing the presence of motion artifacts in a time domain plethysmographic signal obtained from a patient, said method comprising the steps of:

obtaining at least first and second instances of the time domain plethysmographic signal corresponding to at least first and second times;

transforming the first and second instances of the time domain plethysmographic signal to first and second instances of a spectral domain plethysmographic signal;

transforming the first and second instances of the spectral domain plethysmographic signal to first and second instances of a cepstral domain plethysmographic signal;

identifying corresponding peaks in the first and second instances of the cepstral domain plethysmographic signal; and

measuring a difference between Quefrencies associated with the identified corresponding peaks in the first and second instances of the cepstral domain plethysmographic signal.

11. The method of claim 10 wherein the first and second times are separated by at least 1 second.

12. The method of claim 10 further comprising:

comparing the measured difference between Quefrencies associated with the identified corresponding peaks in the first and second instances of the spectral domain plethysmographic signal to at least one Quefrency difference threshold value;

classifying motion present in the portion of the time domain plethysmographic signal between the first and second times based an outcome of said comparing step.

13. The method of claim 10 further comprising:

identifying corresponding peaks in the first and second instances of the spectral domain plethysmographic signal; and

measuring a difference between frequencies associated with the identified corresponding peaks in the first and second instances of the spectral domain plethysmographic signal.

14. The method of claim 14 further comprising:

comparing the measured difference between frequencies associated with the identified corresponding peaks in the first and second instances of the spectral domain plethysmographic signal to at least one frequency difference threshold value; and

classifying motion present in the portion of the time domain plethysmographic signal between the first and second times based an outcome of said comparing step.

15. The method of claim 10 wherein said step of transforming the first and second instances of the time domain plethysmographic signal to first and second instances of a spectral domain plethysmographic signal comprises performing Fourier transformations on the first and second instances of the time domain plethysmographic signal, and wherein said step of transforming the first and second instances of the spectral domain plethysmographic signal to first and second instances of a cepstral domain plethysmographic signal comprises performing Fourier transformations on the first and second instances of the spectral domain plethysmographic signal.

16. The method of claim 15 wherein the Fourier transformations comprise Fast Fourier Transform operations.

17. The method of claim 16 further comprising:

adjusting a size of the Fast Fourier Transform operations in accordance with a pulse rate of the patient.

18. A method of processing at least first and second time domain plethysmographic signals obtained from a patient, said method comprising the steps of:

transforming the first and second time domain plethysmographic signals into first and second frequency domain plethysmographic signals;

transforming the first and second frequency domain plethysmographic signals into first and second cepstral domain plethysmographic signals;

obtaining a series of time domain estimates of an SPO2 level of the patient over a period of time using the first and second time domain plethysmographic signals;

obtaining a series of spectral domain estimates of the SPO2 level of the patient over the period of time using the first and second spectral domain plethysmographic signals;

obtaining a series of cepstral domain estimates of the SPO2 level of the patient over the period of time using the first and second cepstral domain plethysmographic signals;

comparing each of the series of time domain estimates of the SPO2 level of the patient, the series of spectral domain estimates of the SPO2 level of the patient, and the series of cepstral domain estimates of the SPO2 level of the patient obtained over the period of time with a series of DC tracking estimates of the SPO2 level of the patient obtained over the same period of time.

19. The method of claim 18 wherein said step of transforming the first and second time domain plethysmographic signals to first and second frequency domain plethysmographic signals comprises performing Fourier transformations on the first and second time domain plethysmographic signals, and wherein said step of transforming the first and second frequency domain plethysmographic signals to first and second cepstral domain plethysmographic signals comprises performing Fourier transformations on the first and second frequency domain plethysmographic signals.

20. The method of claim 19 wherein the Fourier transformations comprise Fast Fourier Transform operations.

21. The method of claim 20 further comprising:

adjusting a size of the Fast Fourier Transform operations in accordance with a pulse rate of the patient.

22. The method of claim 18 further comprising:

transmitting a red wavelength optical signal through a tissue site of the patient to obtain the first time domain plethysmographic signal; and

transmitting an infrared wavelength optical signal through the tissue site of the patient to obtain the second time domain plethysmographic signal.

23. The method of claim 18 further comprising:

selecting at least one desired portion of the first time domain plethysmographic signal; and

selecting at least one desired portion of the second time domain plethysmographic signal;

and wherein, in said step of transforming the first and second time domain plethysmographic signals into first and second frequency domain plethysmographic signals, only the selected desired portions of the first and second time plethysmographic signals are transformed into the first and second frequency domain signals.

24. The method of claim 23 further comprising:

analyzing the first and second time domain plethysmographic signals without selecting portions thereof to identify at least one desired portion of each of the first and second time domain plethysmographic signals wherein motion artifacts present in the first and second plethysmographic signals are below an acceptable level.

25. The method of claim 18 further comprising:

selecting at least one of the time domain, spectral domain, cepstral domain, and DC tracking estimates of the SPO2 level of the patient for reporting as the SPO2 level of the patient based on an outcome of said comparing step.

26. The method of claim 18 further comprising:

generating, when an outcome of said comparing step indicates that at least one of the series of time domain, the series of spectral domain, and the series of cepstral domain estimates of the SPO2 level of the patient agree with the series of DC tracking estimates of the SPO2 level of the patient, a calibrated series of DC tracking estimates of the SPO2 level of the patient by adjusting SPO2 values from the series of DC tracking estimates of the SPO2 level of the patient used in said comparing step in accordance with information derived from at least one of the series of time domain, the series of spectral domain, and the series of cepstral domain estimates of the SPO2 level of the patient.

27. The method of claim 26 wherein said generating step is undertaken only when an outcome of said comparing step indicates that all three of the series of time domain, the series of spectral domain, and the series of cepstral domain estimates of the SPO2 level of the patient agree with the series of DC tracking estimates of the SPO2 level of the patient.

28. The method of claim 26 further comprising:

reporting an SPO2 value from the calibrated series of DC tracking estimates of the SPO2 level when an outcome of said comparing step indicates that none of the series of time domain, the series of spectral domain, and the series of cepstral domain estimates of the SPO2 level of the patient agree with the series of DC tracking estimates of the SPO2 level of the patient used in said comparing step.

29. A method of processing first and second time domain plethysmographic signals obtained from a patient, said method comprising the steps of:

transforming the first and second time domain plethysmographic signals into first and second frequency domain plethysmographic signals;

computing first and second energy spectrums from the first and second frequency domain plethysmographic signals;

transforming the first and second frequency domain plethysmographic signals into first and second cepstral domain plethysmographic signals;

using the first and second cepstral domain plethysmographic signals to identify spectral peaks in the first and second energy spectrums that are associated with a pulse rate of the patient;

computing normalized amplitudes of the identified spectral peaks;

utilizing the normalized amplitudes of the identified spectral peaks to obtain a perfusion index value for the patient.

30. The method of claim 29 wherein said step of transforming the first and second time domain plethysmographic signals to first and second frequency domain plethysmographic signals comprises performing Fourier transformations on the first and second time domain plethysmographic signals, and wherein said step of transforming the first and second frequency domain plethysmographic signals to first and second cepstral domain plethysmographic signals comprises performing Fourier transformations on the first and second frequency domain plethysmographic signals.

31. The method of claim 30 wherein the Fourier transformations comprise Fast Fourier Transform operations.

32. The method of claim 31 further comprising:

adjusting a size of the Fast Fourier Transform operations in accordance with a pulse rate of the patient.

33. The method of claim 29 wherein said step of computing first and second energy spectrums comprises squaring and summing respective real and imaginary frequency components of the first frequency domain plethysmographic signal and second frequency domain plethysmographic signal.

34. The method of claim 29 wherein said step of utilizing comprises:

calculating the perfusion index value in accordance with the following expression:

$$PI = (ESamp(1)*1stValue + ESamp(2) + 2ndValue)*EScaling$$

wherein ESamp(1) is the normalized amplitude of the identified spectral peak in the first energy spectrum, ESamp(2) is the normalized amplitude of the identified spectral peak in the second energy spectrum, 1stValue is a first predetermined value, 2ndValue is a second predetermined value, and ESscaling is a scaling factor.

35. The method of claim 34 wherein 1stValue equals 0.0563 and 2ndValue equals 0.3103.

36. The method of claim 29 further comprising:

transmitting a red wavelength optical signal through a tissue site of the patient to obtain the first time domain plethysmographic signal; and

transmitting an infrared wavelength optical signal through the tissue site of the patient to obtain the second time domain plethysmographic signal.